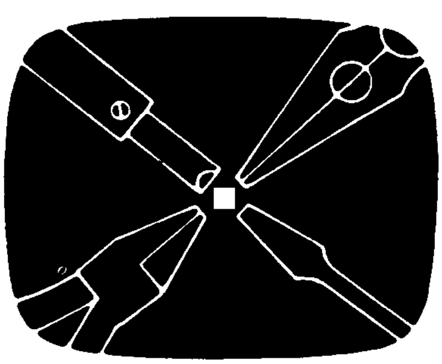


SERVICING television receivers

L. LAWRY-JOHNS

THORN 850 CHASSIS

It has recently been pointed out to us that although we have covered the 900 and 950 series in these servicing articles we have not dealt with the earlier and very widely used 850 chassis. We shall rectify the omission with this article which although it will concern basically the Ferguson 3618 series should help in the servicing of a very extensive range stretching as far back as the 705T. There are dozens of associated models, too numerous to list, in the HMV, Marconiphone and Ultra brand names of the Thorn group, not to mention other makers who have employed the chassis such as Decca in their DR61.

The basic dual-standard chassis is quite comfortable to work on, the tube being fixed to the front of the cabinet with the leads long enough to enable the chassis to be unlatched and moved back far enough, with the bonding strips removed, to allow access to most parts. The tuners are mounted separately.

Common Faults

Probably the most common fault on this series is failure of one or more sections of the mains dropper. On most models this large wire-wound resistor, with its several tappings, is mounted vertically on the left side of the chassis. On some models however it is mounted horizontally at the rear centre. When the symptoms are no mains supply to the valve heaters or to the h.t. rectifier although the supply is at both sides of the fuse-holder it is a matter of moments to check along the tags of the dropper with a neon tester or a.c. voltmeter to find where the supply is present and where it is not.

Having located the faulty section the repairer must then decide whether to replace the whole dropper or wire a replacement section across the faulty one. The faulty section should never be shorted out as this will reduce the reliability of the receiver and shorten its working life. The life and reliability of any receiver are largely determined by the setting of the mains voltage adjustment when the set is first installed, and the tappings should always be set as high as the set will satisfactorily operate. An underrun receiver is always more reliable than one which is overrun by the voltage setting being too low (which is the same as a section of the dropper being linked across).

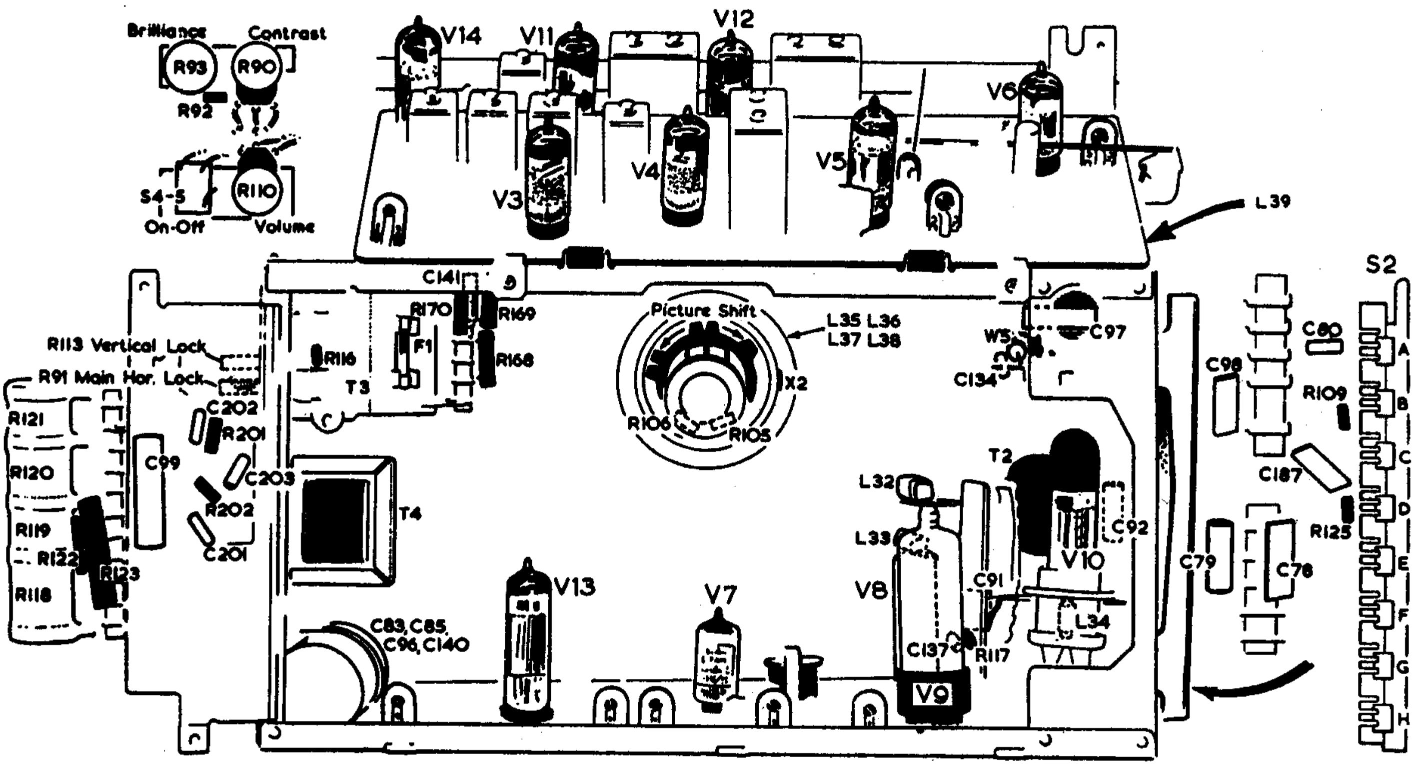
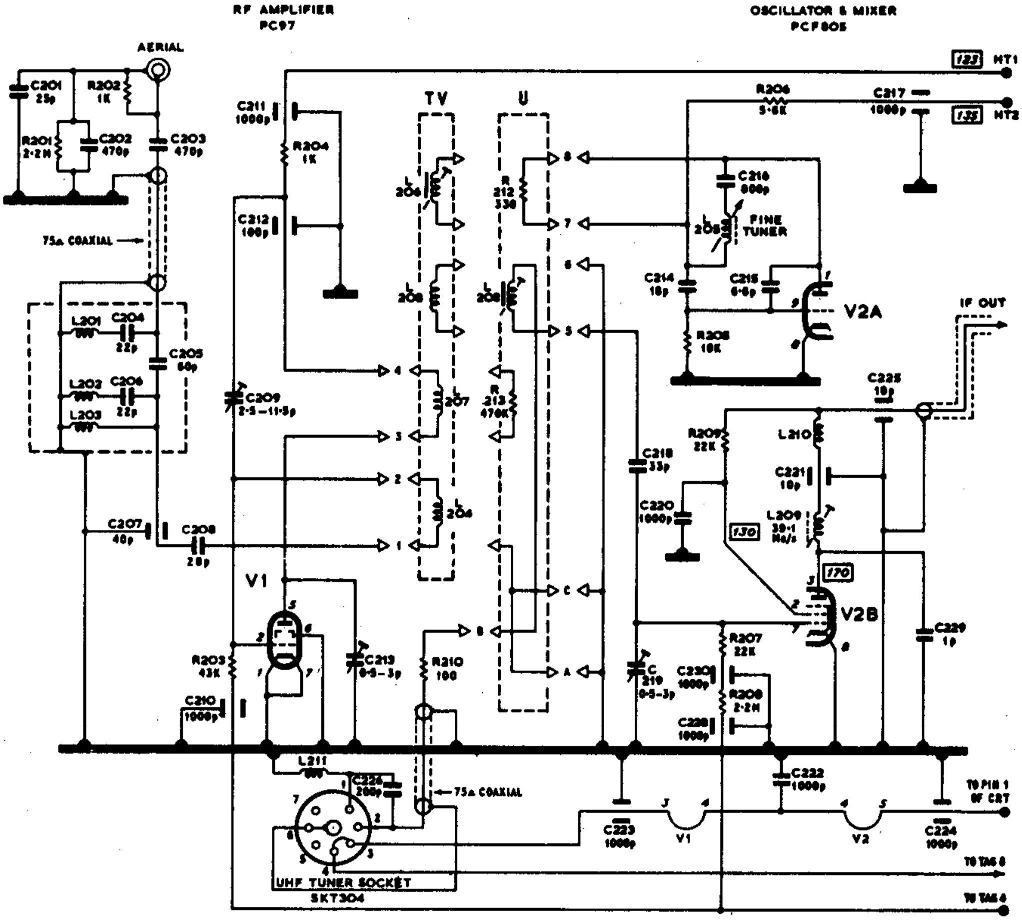


Fig. 1: Rear chassis view. In some versions the mains dropper R118-R121 is mounted horizontally at the rear centre.

Fig. 2 (right): Circuit diagram of v.h.f. tuner type MT6 used on most receivers in this series. L211 and C226 not fitted on all tuners. Early models were fitted with tuner type MT4. This is similar, the main difference being the use of a PCF86 in position V2.



The upper sections of the dropper concern the h.t. supply and a failure here will leave the valve heaters glowing. There are two other separate resistors associated with the dropper. The larger is R123 (107Ω) in the d.c. smoothing circuit and the smaller R122 (10Ω) in the voltage adjustment (a.c.) side. Both are 10W 5% types.

We would stress that these resistor figures and remarks apply to the actual receivers under discussion and not to earlier models which used a different dropper and smoothing arrangement.

VHF Tuner

This tuner suffers from the usual contact trouble but there is no difficulty in cleaning the turret studs as the cover is easily sprung off and there is room to do this In isolated cases where cleaning is not effective the spring carrier can be levered in slightly to effect more positive contact with the studs. This can be done with a screwdriver blade without using undue force.

Other than this the most common trouble is associated with the fine-tuner sprocket disc at the rear. The disc becomes loose on its spindle which prevents the sprockets exerting the correct pressure on the fine-tuning plate. The fine-tuner knob at the rear therefore becomes ineffective. The disc is secured on the shaft by a grub screw. This can only be tightened effectively with an Allen key (1/16 in.). Using a small screwdriver will spoil the screw and will not effect a positive grip.

We have also known the wire which operates the fine-tuner core to come adrift from the nylon bush on the end of the lever and this is a possibility which should not be overlooked.

Apart from valve failure the other troubles seem to be confined to resistors changing value—check R206 and R209—and shorted lead-through capacitors. This latter condition causes the h.t. feed resistors (R169 or R170) to cook up—these resistors are mounted to the right of the fuse F1 as shown on the rear view diagram.

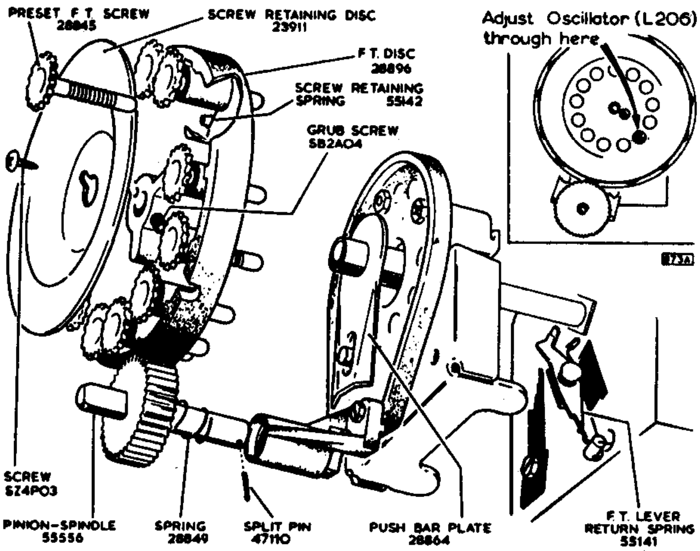


Fig. 3: Preset fine tuning mechanism. On some models manual fine tuning is used.

UHF Tuner

Very little trouble should be experienced with this unit. Loss of gain calls attention to the PC88 and PC86 valves (tuning drift to the latter). Apart from this we have known resistors to change value and wires to spring off the valve base tags, in particular from pin 2 of the PC88 causing complete loss of u.h.f. signal.

Video Faults

The video amplifier is a PCL84 (V5). This valve sometimes gives trouble leading to loss of vision signals. Probably the most serious effect is when the valve develops a screen-to-grid short. When this happens not only do the associated resistors cook up but the vision detector diode is usually ruined by the excessive current flow. This of course is W1 (OA70) inside the oblong can to the left of the PCL84.

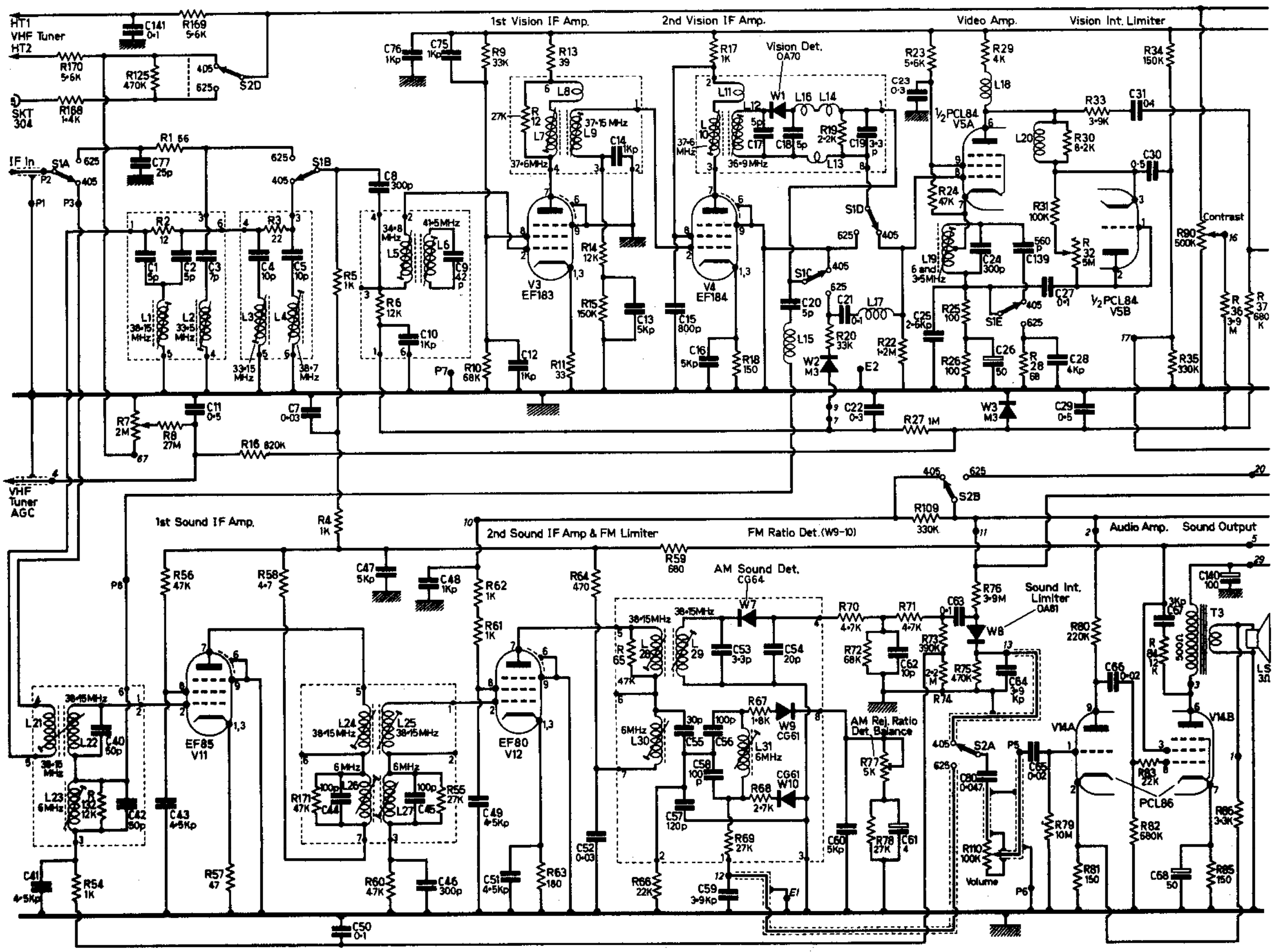


Fig. 4: Circuit diagram of the

Quite often however the valve is blameless and resistors change value on their own account, particularly R24 (47kΩ).

Weak sync may be caused by C26 losing capacitance (50μF) or R24 changing value, whilst on 625 the field sync can often by improved by changing C23 from 0·03μF to 200pF.

Field Timebase

Whatever field faults may be experienced, one item must always be checked. This is R138. If V7 is removed, R138 will be found immediately behind it. It is 22kΩ and frequently changes value causing loss of height and field roll. Replace with a 1W resistor of the same value. Other causes of field roll may be a faulty valve—check the PCL85 and the ECC804 (6-30L2)—R144 (2·2MΩ) changing value or a leaky capacitor (check C113 and C114).

Bottom compression is another extremely common trouble. Check the PCL85, try another 100μF capacitor cross C117 and check the value of R150 (possibly damaged by excessive current through a faulty PCL85). It should be remembered that a decrease in value of the cathode bias resistor will not only cause poor linearity but also shorten the life of the valve. An increase in value will cause top compression (a fact that is not always realised). C119 (0·01μF) sometimes leaks causing bottom compression and this is another item which should not be overlooked.

Total loss of field scan, resulting in a single white line across the centre of the screen, can be caused by a faulty valve (V7 or V13) and quite often by a faulty field output transformer. In this case there will be no h.t. at the PCL85 anode pin 6 (there will be h.t. at point 28 on the panel but not at point 30). Check the primary and secondary connections on a replacement transformer as these may not be the same as the original.

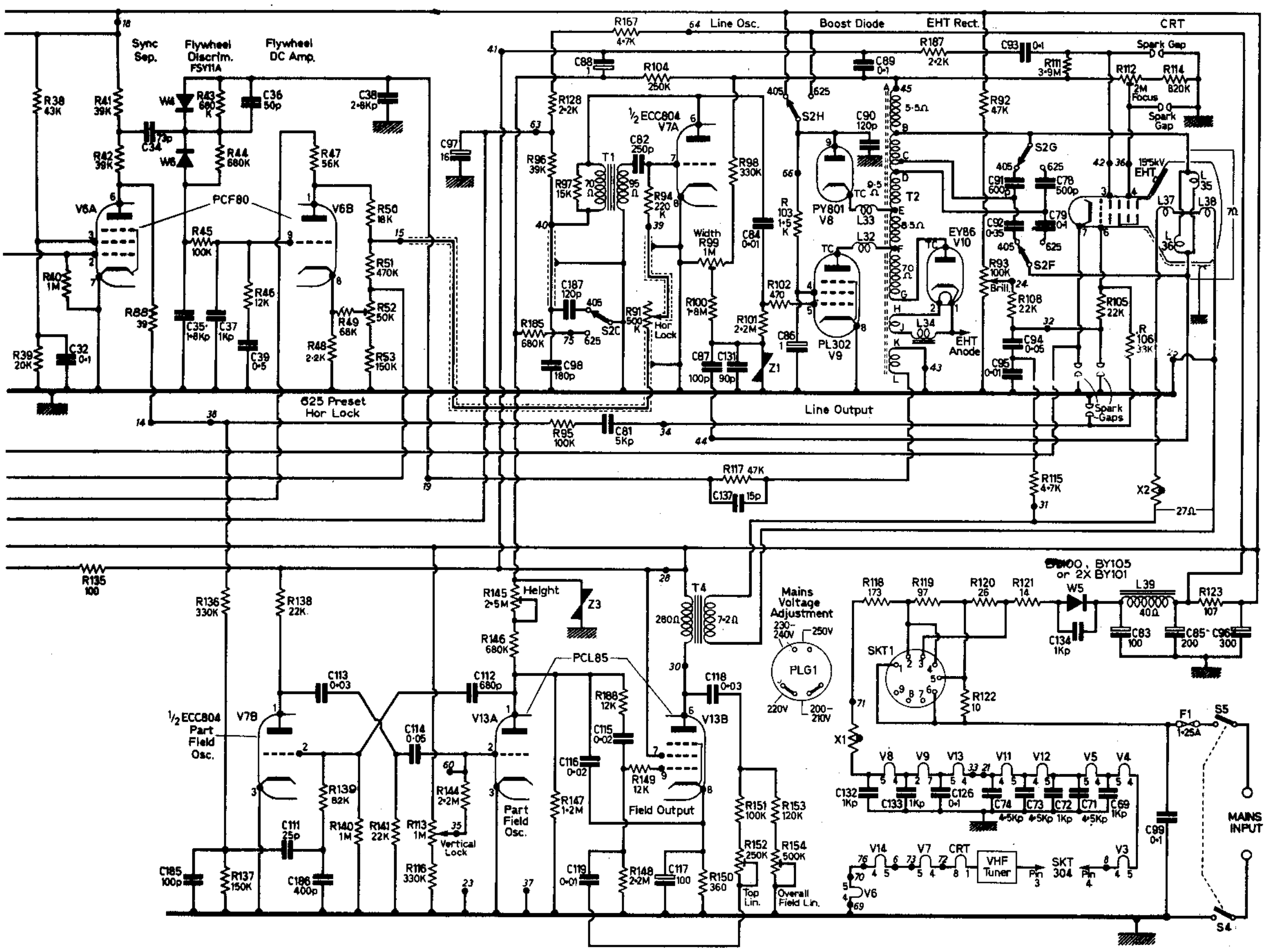
Electrolytics

The main smoothing block on the lower left side can give rise to several different fault symptoms including poor sync, hum bars on the picture, wavy verticals etc. The leads to the several tags are wrapped, not soldered. When a replacement block is fitted the leads should be soldered as any attempt to wrap will cause the wires to fracture.

Receivers with Radio

Models such as the HMV 2614 incorporate facilities for f.m. radio reception. An extra switch is mounted on the v.h.f. tuner shaft and this switches the timebase h.t. out and a compensating resistor in (to adjust the h.t. voltage) when the turret is rotated to select the Radio 2, 3 or 4 coil biscuits. The i.f. output is then 6MHz and this is passed to the sound i.f. and 625 f.m. detector stages.

TO BE CONTINUED



Thorn 850 dual-standard chassis

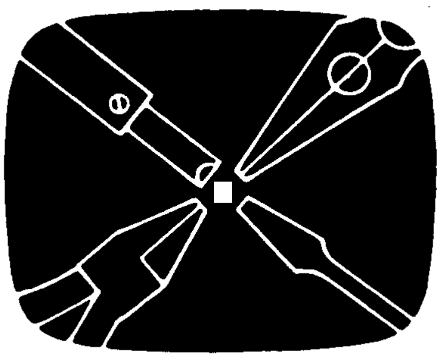
Models fitted with the Thorn 850 dual-standard chassis include the following: Decca DR61 and DR71; Ferguson 3617, 3618, 3619, 3620, 3621 and 3622; HMV 2609, 2614*, 2616 and 2618; Marconiphone 4609 and 4610; Ultra 6619, 6621* 6622 and 6623*. Models with an asterisk following incorporate f.m. radio circuitry.

VOLTAGE DATA

Taken with 208V mains input and no signal. Contrast and local/distant controls at maximum, all other controls set for normal operation. Total h.t. current 300mA (405), 330mA (625). Boost voltage (junction T2/C89) 508V (405), 650V (625).

H.T. at C83 243V, at junction L39/C85 230V, on both systems.

Valve		*Anode volts*		*Screen volts*		*Cathode volts*	
		405	625	405	625	405	625
V3	EF183	204	206	48	48	—	—
V4	EF184	190	193	190	195	2	2
V5A	PCL84	126	148	160	167	8	1
V5B		68	80	—	—	125	148
V6A	30C1/PCF80	135	146	41	44	—	—
V6B		74	112	—	—	—	—
V7A	6-30L2/ECC804	139	118	—	—	—	—
V7B		73	73	—	—	—	—
V9	PL36 or 30P19/PL302	—	—	170	190	—	—
V11	EF85	174	92	130	35	—	—
V12	EF80	166	92	177	22	2	0·5
V13A	PCL85	33	33	—	—	—	—
V13B		190	197	205	208	19	19
V14A	PCL86	97	97	—	—	—	—
V14B		196	202	205	208	4·5	4·5



SERVICING television receivers

L. LAWRY-JOHNS

THORN 850 CHASSIS—cont.

Shorts in the IF Stages

Whilst it is difficult to say where a short may occur to cause overloading and resistor burn-outs, it is quite possible to state that such conditions will be caused by a shorted decoupling capacitor of the ceramic type. When one of the decoupling capacitors does short it is a question of whether the fuse will fail or whether the feed resistor concerned will burn out and thus disconnect the shorted capacitor from the h.t. line.

Let us assume that C15 shorts. R17 will overheat. This is hardly surprising as it is being asked to pass some 200mA. The resulting heat causes the small resistor to change value thus increasing the current and the heat until the fuse fails or the resistor disintegrates. The value of the replacement decoupling capacitor is not too critical, around 1,000pF.

Some trouble was experienced with the actual i.f. coils soon after these sets were first produced but if this has not occurred after several years it is not likely to occur now.

What is likely to occur however is the symptom of a practically inoperative contrast control, with obvious overloading. Whilst this could be due to a number of different causes—a shorted diode, grid-cathode leakage in the controlled valves, etc.—we have often found that a positive voltage at pin 2 of the EF183, V3, rises alarmingly when the valve is removed, thus proving that the valve is not at fault. The trouble is therefore in this immediate stage and C8 (300pF) will be found shorted.

Tube Faults

Readers are referred to the April issue, page 303, for notes on tube defects and possible remedies.

Line Timebase

Lack of width is usually due to a low emission PL36 (30P19) but the width circuit should not be overlooked. R100 can change value, the width control R99 can be faulty and the v.d.r. Z1 can give trouble. The PY81 and the ECC804 should also be checked.

If there is no picture at all, with no line whistle on 405 and the EY86 not lighting up, check the above valves, then the boost capacitor C89 0·1μF· and the screen feed resistor R103 (1·5kΩ). This latter component is often damaged by a faulty PL36. A check on the boost capacitor can be made by removing the top cap of the PY81. If this restores some degree of line operation the boost capacitor is shorted.

If the line hold control is at one end of its travel check V7. R94 and C82. If these are in order check

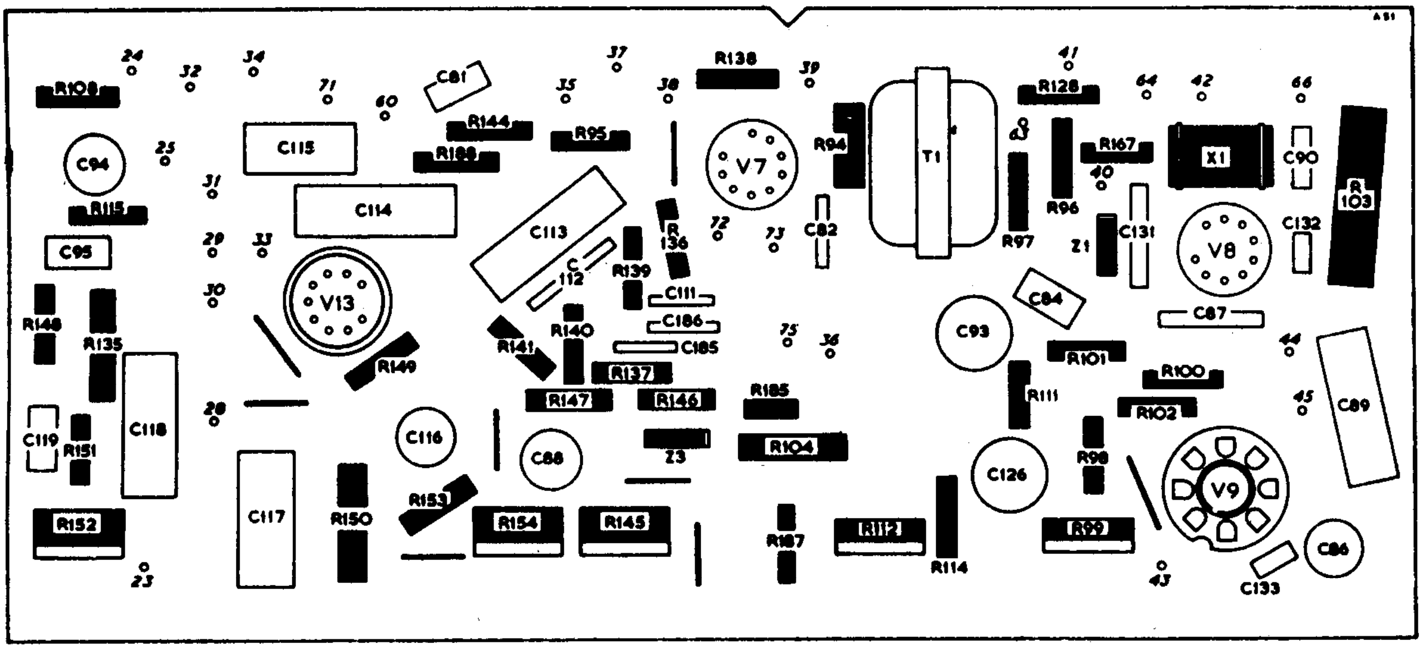


Fig. 5: Layout of the timebase printed board, component side. Figures in italics are tag connections.

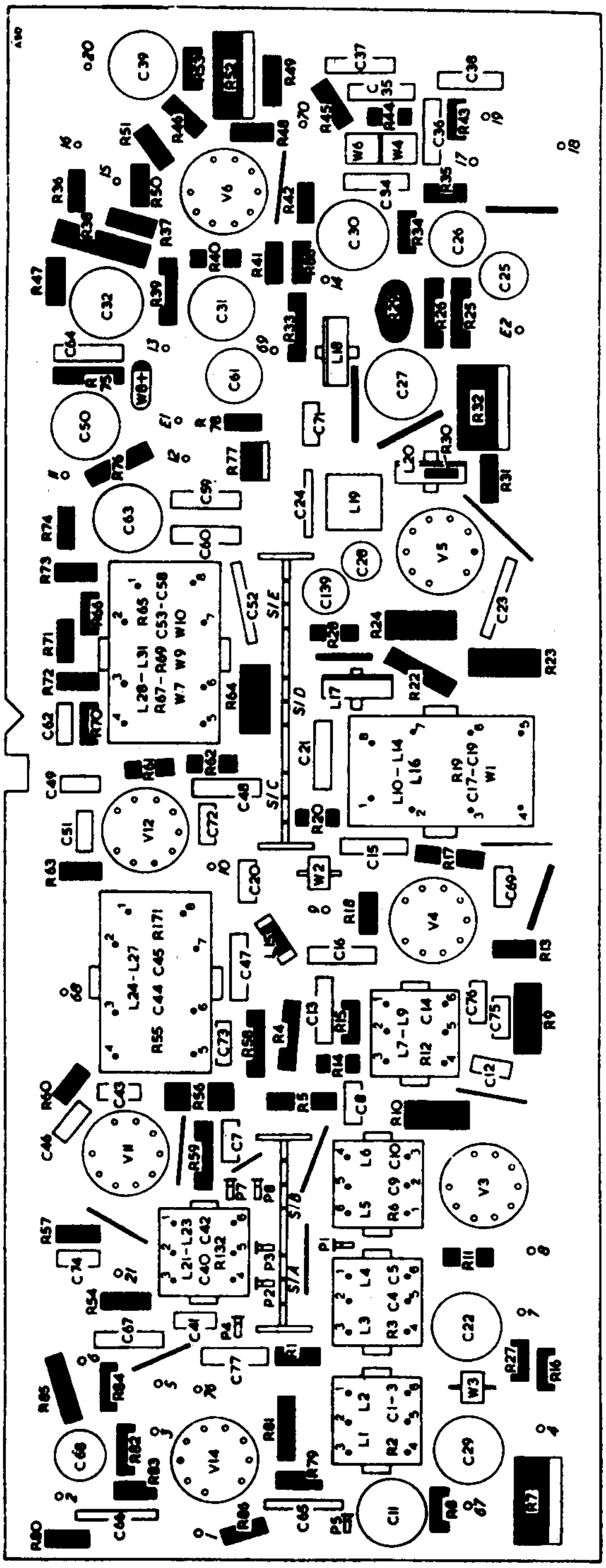


Fig. 6: Layout of the i.f. printed board. The tag connection numbers (italics) correspond to those given in the circuit diagram.

V6 and the associated components, and if necessary the FSY11A discriminator diodes W4 and W6.

Deflection Coils

Severe brushing resulting in white flashing across the screen can be due to insulation breakdown in the scan coils and new coils may have to be fitted. Quite often however the brushing and noise of discharge on the sound are due to the line coils arcing to the closed-loop sleeve, puncturing the paper covering at one point. Whilst a new sleeve can be fitted, moving the existing one out or turning it round so that the puncture is to the rear may stop the effect permanently. We hasten to add that the sleeve must not be rotated as it will then interfere with the field scan and cause distortion of a pincushion nature at the top and bottom.

The Line Output Transformer

Insulation breakdown can and does occur in the transformer. In some cases there is no alternative to a replacement transformer but it is often possible to move the EY86 heater winding slab around or insert insulation. A single turn of well-insulated e.h.t. cable is sufficient to work a DY87 in place of the EY86/87.

Top Cap Coils

The coils (L32 and L33) to the top caps of the PL36 and the PY81 sometimes become open-circuit. Thus in the event of the stage becoming inoperative check both ends of these coils.

Modifications

On chassis with an *additional* A after the schedule suffix letter a different v.h.f. tuner unit is used. This has a PCC189 cascode r.f. amplifier stage and PCF801 frequency changer. C77 is reduced to 15pF with this tuner.

In early production models L16 is omitted, C7 is 4,500pF, R33 8·2kΩ, R150 390Ω and the v.h.f. tuner a.g.c. lead unscreened.

In schedule D models the field deflector coils L37/L38 are returned to h.t. instead of to the printed board earth and capacitors (C41 etc.) with 4,500pF value may be 4,300pF.

In schedule E models C23 is 200pF and R135, C140 supply V13B instead of V14B.

Fine Tuning Range Adjustment

If the fine tuning range is insufficient to tune a particular channel, adjust the oscillator core as follows: Set the fine tuning control to the middle of its range—on receivers fitted with a preset fine tuning mechanism turn the control to bring the cogged wheel of the preset fine tuning screw to mid-position. With the volume control at minimum inject the sound carrier frequency of the appropriate channel at the aerial socket. Adjust the signal input for an adequate deflection on a video output meter (e.g. Avo Model 8 on its 100V d.c. range) then adjust L206 (for access see Fig. 2) using a fully insulated trimming tool for minimum video output. The video output meter should be connected across R29, its positive lead being taken to tag 18 and its negative lead via a 22kΩ resistor to L18 and via an 800pF capacitor to tag E1. The positions of these connections are shown in Fig. 6.

NEXT MONTH: THE STC VC11 CHASSIS USED ON KB PORTABLE MODELS.